

INTERNATIONAL SEARCH REPORT

International application No. .
PCT/AU2004/000480

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: (C12Q 1/68, 1:46)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
See Electronic Database

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
See Electronic Database

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPIDS, CA, Medline: Streptococcus pneumoniae, cps, cpa, capsular polysaccharide antigen, cpsA, cpsB, wzg, wzh, wzx, wzy, serotype?, antigen?

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Jiang et al "Molecular characterisation of Streptococcus pneumoniae Type 4, 6B, 8 and 18C capsular polysaccharide gene clusters" Infection and Immunity (2001). Vol 69(3): 1244-1255 (see the whole document) GENBANK ACCESSIONS AF316639, AF316640, AF316641 and AF316642 19 March 2001	1-31

☒ Further documents are listed in the continuation of Box C ☐ See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 28 July 2004	Date of mailing of the international search report - 4 AUG 2004
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer LEXIE PRESS Telephone No : (02) 6283 2677

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Lawrence et al. "Evaluation of serotype prediction by cpsA-cpsB gene polymorphism in <i>Streptococcus pneumoniae</i> " Journal of Clinical Microbiology (2000) Vol 38(4): pages 1319-1323 (see the whole document)	1-11, 18-22, 25-31
P,X	Kong and Gilbert. "Using cpsA-cpsB sequence polymorphism and serotype-/group-specific PCR to predict 51 <i>Streptococcus pneumoniae</i> capsular serotypes" Journal of Medical Microbiology (2003) Vol 52: pages 1047-1058 (see the whole document)	1-31

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See Extra Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

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Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: III

Rule 13.1 of the PCT requires that an International Application should relate to one invention only, or if there is more than one invention, that the inclusion of those inventions in one International Application is only permitted if all inventions are so linked as to form a single general inventive concept. Unity of invention exists only when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding "special technical features". The expression "special technical features" is defined in Rule 13.2 as meaning those technical features that define a contribution that each of the inventions, considered as a whole, makes over the prior art. Accordingly the following three inventions have been found.

Invention 1

Claims 4-11, 16, 17, 23, 24 and 27 completely and claims 1-3, 15, 18-21, 26 and 28-31 in part, recite methods for serotyping *Streptococcus pneumoniae* based on analysis of the nucleotide sequence between the 3' end of the *cps A* gene and the 5' end of the *cpsB* gene, and polynucleotide sequences spanning the region between the 3' end of the *cps A* gene and the 5' end of the *cpsB* gene.

Invention 2

Claims 1-3, 12-15, 18-22, 25, 26, 28-31 in part, relate to methods of serotyping *Streptococcus pneumoniae* based on analysis of the *wzy* gene or portion thereof, and nucleotide sequences comprising at least the *wzy* gene from different *S. pneumoniae* strains.

Invention 3

Claims 1-3, 12-15, 18-22, 25, 26, 28-31 in part, relate to methods of serotyping *Streptococcus pneumoniae* based on analysis of the *wzx* gene or portion thereof, and nucleotide sequences comprising at least the *wzx* gene from different *S. pneumoniae* strains.

Although the claims share the feature that they relate to *S. pneumoniae* capsular (*cps*) genes, these genes and their use in molecular serotyping of *S. pneumoniae* are known. Jiang et al teaches serotype variation in the *wzg*, *wzh*, *wzx* and *wzy* genes. Therefore methods of serotyping *Streptococcus pneumoniae* or *cps* sequences can not be regarded as a unifying technical feature.